

Amendments to the Specification:

Please add the following new paragraph after paragraph [0021]:

[0021.1] FIG. 8 shows an exemplary process for fitting the ideal teeth.

Please replace paragraph [0024] with the following amended paragraph:

[0024] Referring now to FIG. 2A, the lower jaw 100 includes a plurality of teeth 102, for example. At least some of these teeth may be moved from an initial tooth arrangement to a final tooth arrangement. As a frame of reference describing how a tooth may be moved, an arbitrary centerline (CL) may be drawn through the tooth 102. With reference to this centerline (CL), each tooth may be moved in orthogonal directions represented by axes 104, 106, and 108 (where 104 is the centerline). The centerline may be rotated about the axis 108 (root angulation) and the axis 104 (torque) as indicated by arrows 110 and 112, respectively. Additionally, the tooth may be rotated about the centerline, ~~as represented by an arrow 114~~. Thus, all possible free-form motions of the tooth can be performed.

Please replace paragraph [0026] with the following amended paragraph:

[0026] FIG. 2C shows one adjustment appliance 111 which is worn by the patient in order to achieve an incremental repositioning of individual teeth in the jaw as described generally above. The appliance is a polymeric shell having a teeth receiving cavity. This is described in U.S. Application Serial No. 09/169,276, filed October 8, 1998, which claims priority from U.S. Patent No. 5,975,893, which in turn claims priority from provisional application number 60/050,352, 06/050,352, filed June 20, 1997 (collectively the “prior applications”), the full disclosures of which are incorporated by reference.

Please replace paragraph [0029] with the following amended paragraph:

[0029] The polymeric appliance 111 of FIG. 2C may be formed from a thin sheet of a suitable elastomeric polymer, such as Tru-Tain 0.03 in, thermal forming dental material,

available from Tru-Tain Plastics, Rochester, Minnesota. Usually, no wires or other means will be provided for holding the appliance in place over the teeth. In some cases, however, it will be desirable or necessary to provide individual anchors on teeth with corresponding receptacles or apertures in the appliance 111 100 so that the appliance can apply an upward force on the tooth which would not be possible in the absence of such an anchor.

Please replace paragraph [0037] with the following amended paragraph:

[0037] For example, cusp features associated with each tooth may be used. Cusps are pointed projections on the chewing surface of a tooth. In a detection stage, a possible cusp is viewed as an "island" on the surface of the tooth, with the candidate cusp at the highest point on the island. "Highest" is measured with respect to the coordinate system of the model, but could just as easily be measured with respect to the local coordinate system of each tooth. The set of all possible cusps is determined by looking for all local maxima on the tooth model that are within a specified distance of the top of the bounding box of the model. First, the highest point on the model is designated as the first candidate cusp. A plane is passed through this point, perpendicular to the direction along which the height of a point is measured. The plane is then lowered by a small predetermined distance along the Z axis. Next, all vertices connected to the tooth and which are above the plane and on some connected component are associated with the candidate cusp as cusps. This step is also referred to as a flood fill step. From each candidate cusp point, outward flooding is performed, marking each vertex on the model visited in this matter as part of the corresponding candidate cusp. After the flood fill step is complete, every vertex on the model is examined. Any vertex that is above the plane and has not been visited by one of the flood fills is added to the list of candidate cusps. These steps are repeated until the plane has [[is]] traveled a specified distance.

Please replace paragraph [0044] with the following amended paragraph:

[0044] Turning now to FIG. 5, a process 320 for performing functional occlusion is shown. Functional occlusion is a process for determining how well the teeth fit together when the jaws

move. The process 320 first acquires tooth/arch jaw registration. This may be done using conventional techniques such as X-ray, a computer tomography, or a mechanical device such as a face bow transfer (322).

Please add the following new paragraph after paragraph [0066]:

[0066.1] FIG. 8 shows an exemplary process for fitting the ideal teeth. First, the process provides a static occlusion determined from a computer representation of the masticatory system. Next, the process models an ideal set of teeth and automatically applies the ideal set of teeth to the computer representation of the masticatory system of the patient. Further, the process optimizes the position of the patient's teeth to fit the ideal set of teeth.